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Prospects of Insurance after Dairy Quota Abolition

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Dairy Quota abolition – What do we know?

- Structural change
  - Expected increase of herd size
- Significant price drop after quota abolition
  - Inelastic demand function and production increase
- Suggested increase of milk price volatility
  - Planning insecurity
  - Additional costs of risk for risk averse dairy farmers

→ Magnitude of milk price volatility and what is the willingness to pay of risk averse dairy farmer to prevent milk price volatility

Price Risk Mangement on dairy farm level

- Production diversification on farm level
- Livestock Gross Margin (LGM) insurance like in the U.S.
  - Highly subsidized instrument to guarantee a specific Gross Margin
- Hedging dairy products on commodity exchanges
  - Size of the farm
  - Costs of education
  - Transaction costs
  - No application because the milk price volatility was too low
  - Basis risk

How to use the willingness to pay to insure stable milk prices and planning security

Data and modelling the milk price series

- Approximating the milk price voaltility after dairy quota abolition with a farm gate milk price series from New Zealand
  - Monthly basis from 2009 until 2014
  - Non-stationary price series

- Using the Geometric Brownian Motion (GBM) to model the milk price for additional 24 months

$$dp_{t,m} = \alpha_m \cdot p_{t,m} \cdot dt + \sigma_m \cdot p_{t,m} \cdot dz$$

- Stochastic simulation of the milk price

Calculation of the willingness to pay to prevent milk price volatility

- Calculation of the certianty equivalent (CE) for risk averse dairy farmers
  - CE is a certain payment that has the same utility as an uncertain payment

- Power Risk Utility function

$$U(GR_{t,m}) = \frac{GR_{t,m}^{1-\theta}}{1-\theta}$$

- the values 0.1464, 0.4115, 0.6762 and 0.906 are used for θ because they represent reasonable Holt and Laury lottery (HLL) values from 5 to 8
- Calculating the utility of the GR

$$E(U(GR_{t,m})) = \left(\sum_{j=1}^{J} U(GR_{t,m,j}) \cdot \frac{1}{J}\right)$$

Calculation of the willingness to pay to prevent milk price volatility

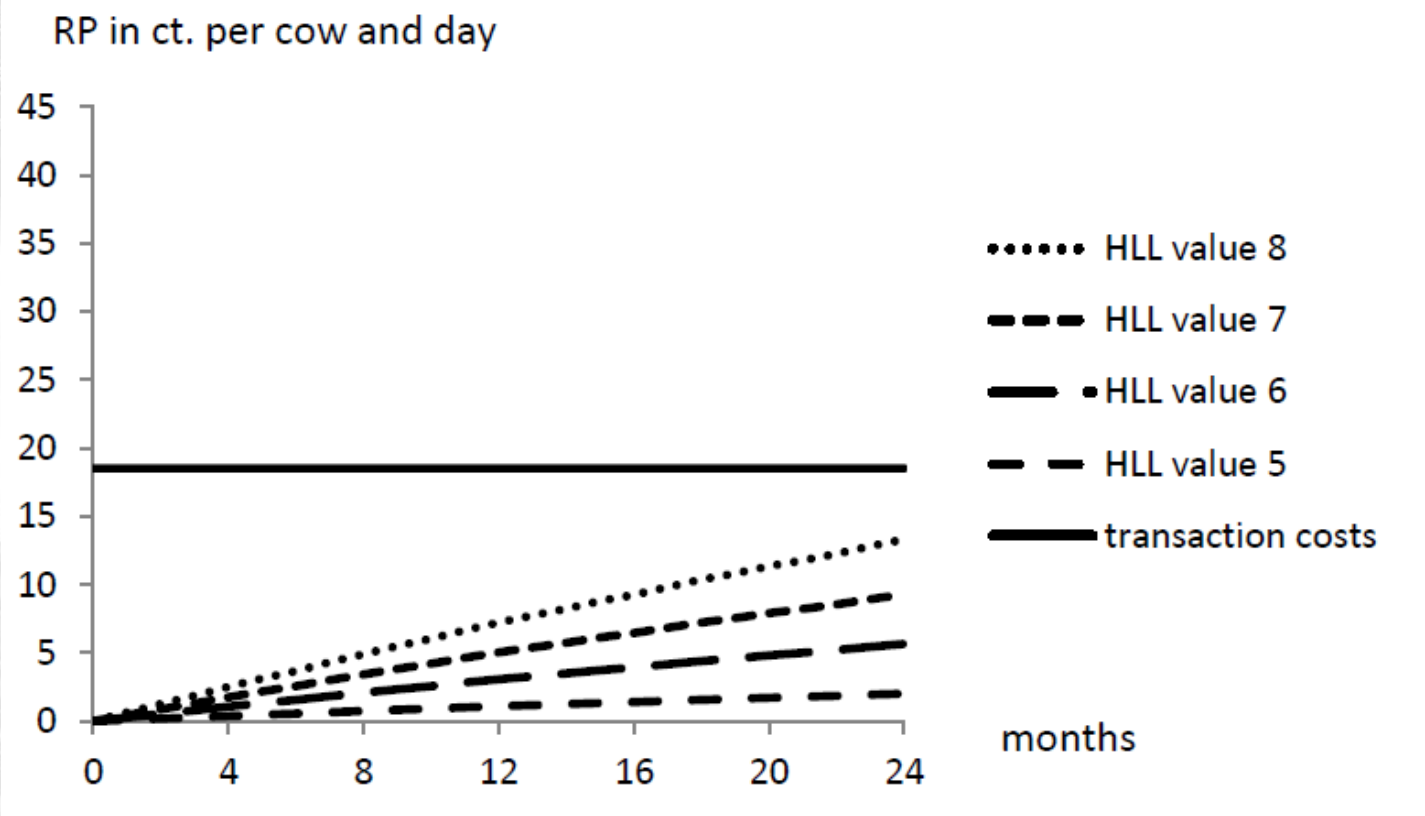
- Using the inverse of the utility function to calculate the CE

$$GR_{t,m}(U) = [U_{t,m} \cdot (1-\theta)]^{\frac{1}{1-\theta}} = [E(U(GR_{t,m})) \cdot (1-\theta)]^{\frac{1}{1-\theta}} = CE_{t,m}$$

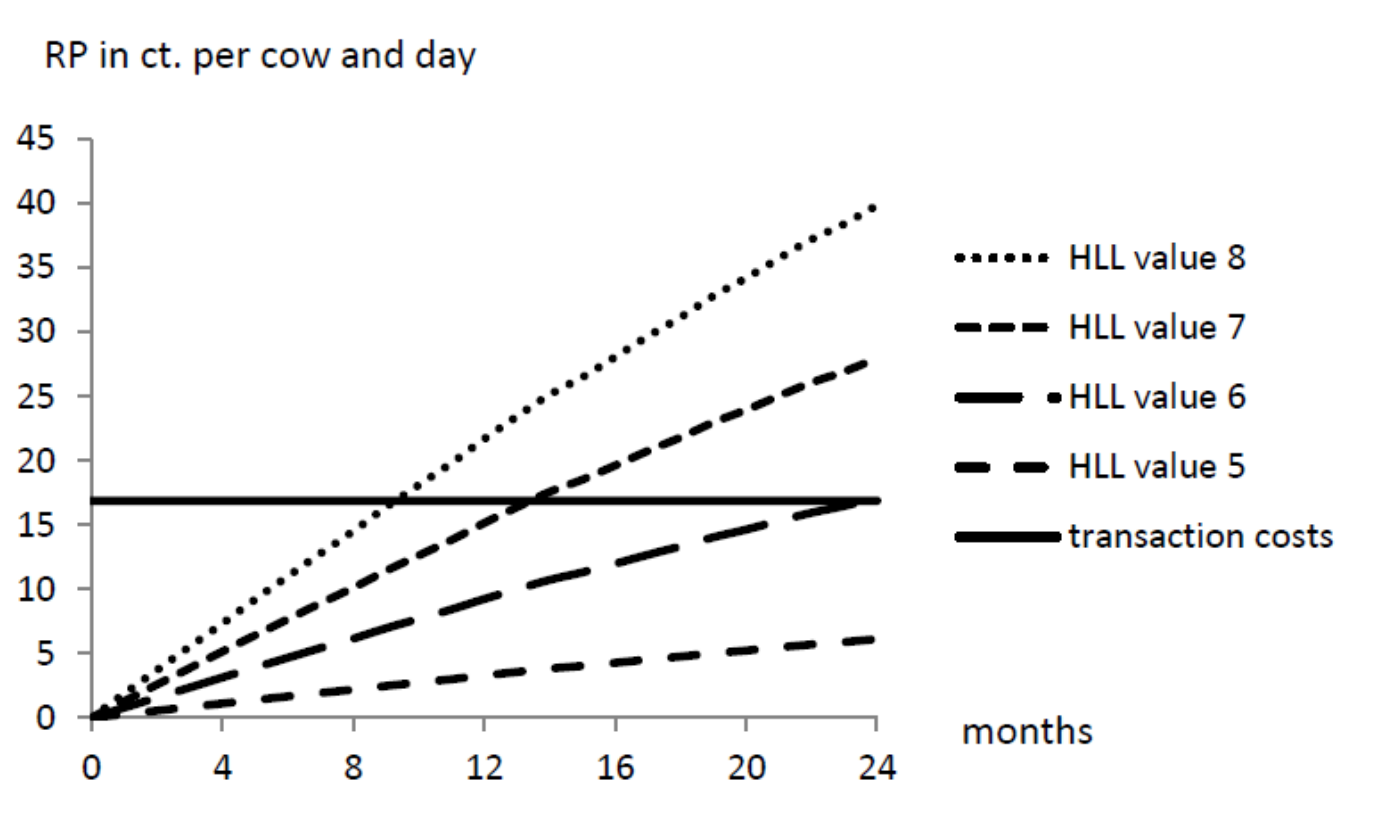
- Risk Premium is the difference between expected Gross Revenue and CE

$$RP_{0,m} = E(GR)_{0,m} - CE_{0,m}$$

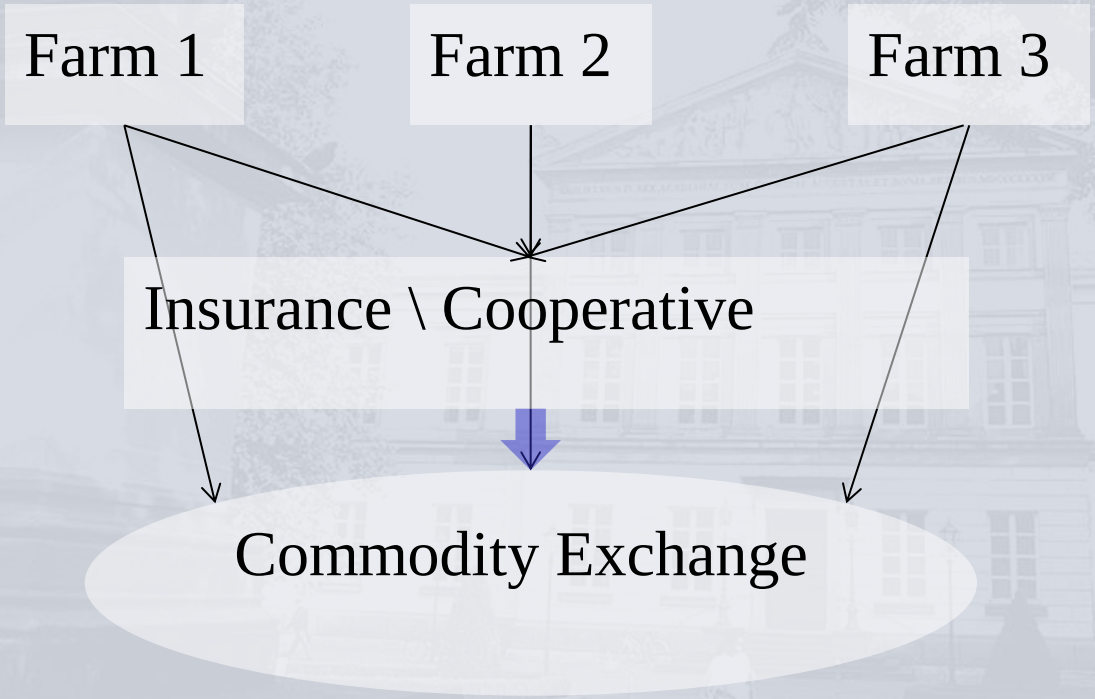
WTP before dairy quota abolition



WTP after dairy quota abolition



How to use the additional WTP?



Conclusion

- Milk price volatility and planning unsecurity of dairy farmers are increasing
- Willingness to pay to prevent milk price volatility are going beyond transaction costs of hedging dairy for risk averse dairy farmers
- Structural reasons are inhibiting the opportunity to hedge for most of the dairy farmers
- Establishing insurance that concentrate the WTP of dairy farmers and hedge dairy products for them on commodity exchanges